2006 MOURNING DOVE POPULATION AND RESEARCH STATUS REPORT

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2005 MOURNING DOVE HARVESTS

Missouri's Small Game Post-season Harvest Survey

Preliminary harvest data for Missouri during 2005 showed 35,948 mourning dove hunters harvested 707,170 doves statewide; a 11.9% decrease in hunters and a 8.2% decrease in harvest from 2004. The estimated 2005 dove harvest decreased 4.2% from the 5-year average (2000-04) (737,995 average harvest; SD 53,813) and decreased 8.2% from the 10-year average (1995-04) (770,264 average harvest; SD 74,521). Statewide, dove hunters averaged 4.2 doves per day and 4.7 days of hunting per season in 2005 compared to 4.4 doves per day and 4.3 days per season in 2004. Average season bag for 2005 was 19.7 mourning doves compared to 18.9 in 2004. Regional data for 2005 showed Northeastern Riverbreaks and Mississippi Lowlands with the highest harvests (187,033 and 119,353 doves respectively) and Northern Riverbreaks the lowest (32,187 doves; Figure 1a).

In addition to dove harvest and number of hunters declining from last year, long-term trends of harvest and hunters also continue to show declines (Figure 3), with daily bag and average days afield remaining relatively stable or slightly increasing (Figure 4). Although the number of hunters and harvested doves has declined since the 1970s, remaining dove hunters are hunting about the same number days, while gradually increasing their daily harvest.

Migratory Bird Harvest Information Program (HIP)

In addition to post-season mail harvest surveys conducted by individual states, the migratory bird harvest information program (HIP) was developed to fill the need for reliable harvest data to help guide management decisions for migratory game birds. Although federal waterfowl harvest surveys had existed since 1952, the historical surveys lacked a reliable sampling frame of names and addresses of all migratory bird hunters and, therefore, did not adequately address webless migratory game birds (e.g., mourning doves, woodcock). The HIP harvest survey provides reliable estimates of hunter activity and harvest at national and regional scales for all migratory game bird species, and provides harvest estimates at the state scale that are comparable among states.

During the 2005 season, Texas led the Central Management Unit (CMU; Figure 2) in mourning dove harvest with 5.71 million birds killed by 257,200 dove hunters (Table 1). During 2005, Missouri was fifth in mourning dove harvest with 641,800 doves killed by 40,200 dove hunters; Arkansas, Oklahoma, and Kansas were second, third and fourth in harvest and hunter numbers, respectively (Table 1).

MOURNING DOVE POPULATIONS TRENDS/SURVEYS

The Department annually conducts two dove surveys in Missouri, the National Mourning Dove Call-Count Survey (CCS) and the Roadside Dove Survey (RDS). The CCS is a national survey conducted annually in cooperation with the states and the USFWS. The CCS was established in 1966, and currently contains ≥1,000 survey routes nationally. The CCS was established to provide

regional and national population indices. In Missouri, the CCS provides an index of doves heard calling per mile along 20 standard routes. The RDS is an independent survey conducted annually by Department staff; the survey contains usable data going back to 1948. The RDS provides an index of doves seen, rather than calling, along standardized routes throughout the state (some urban counties have been excluded because of traffic concerns). The RDS provides regional data for Missouri that the CCS cannot supply. There is very strong long-term relationship between both surveys over several decades; however, the two surveys may show opposite trends within a given year.

National Mourning Dove Call-Count Survey

For Missouri, CCS route regression analysis between 2005 and 2006 showed a nonsignificant ($P > 0.1$) decrease of 1.6% (90% CI −30.1% to 27.0%; Figure 5). During the last 10-years (1997-06), Missouri's CCS dove trend data showed a nonsignificant ($P < 0.05$) decrease of 1.8% (90% CI −4.3% to 0.7%) per year. Long-term trends from Missouri's CCS data continued to show a significant ($P < 0.05$) decline of 1.9% (90% CI −3.4% to −0.5%) per year from 1966-2006. Throughout the 14 Central Management Unit (CMU; Figure 2) states, 2006 dove populations showed a significant ($P < 0.01$) decrease of 6.4% (90% CI −16.1% to -5.8%) compared to 2005 population indices. Surprisingly, the moving 10-year average trend in doves heard along CCS routes showed the lowest levels since the estimated 1979–1988 trend (Figure 6).

Missouri's Roadside Mourning Dove Survey

Statewide results of the 2006 RDS showed 1.60 doves/mile; a 29.0% increase compared to 2005 (Figure 5), a 29.4% increase from the statewide 5-year average (2001-05; 1.31 doves/mile, SD 0.08), and a 54.3% increase from the statewide 10-year average (1996-05; 1.28 doves/mile, SD 0.15; Table 2). By zoogeographical regionas (Figure 1a), Mississippi Lowlands had the highest index (2.09 doves/mile) and the Ozark Plateau the lowest (0.70 doves/mile; Table 2a). By MDC administrative regions (Figure 1b), Kansas City Region had the highest index (2.58 doves/mile) and Ozark Region the lowest (0.69 doves/mile; Table 2b).

This year the CCS trend (calculated by linear regression) showed a slight decrease, and RDS data showed meaningful trend increases (Figure 5), indicating stable to slightly higher population levels compared to previous years. Depending upon weather conditions the last week of August and early September and food availability to concentrate doves, hunting opportunities are anticipated to be good.

Long-Term Population Trends

Long-term mourning dove trends from both RDS and CCS surveys provide an interesting picture (Figure 5). Since 1966, both surveys show a strong relationship to each other ($r = 0.73$; 1966-2006). If we assume that these 2 surveys are tracking similar aspects of the mourning dove population, we see 3 things from Figure 5. First, we see that although trends have declined since 1966, the trend has been relatively stable in the last 10 years. Second, we see that although trends are lower today than during the late 1960s, RDS trends are near levels similar to the late 1940s and early 1950s. Third, we see that some phenomena occurred during the late 1950s and early 1960s that caused trends to climb rapidly. Regionally, we can speculate that some beneficial and broad scale land use changes occurred in the Mississippi Lowlands, Northeast Riverbreaks, Northeastern Riverbreaks, and Western Prairie during the late 1950s and early 1960s (Figure 10-17).

From a national perspective, some controversy exists about the relative merits of the North American Breeding Bird Survey (BBS) and CCS surveys, and the actual ability of the surveys to

track real changes in mourning dove population trends. Although the CCS protocol is specifically designed for doves, the number of survey routes is less compared to the BBS, which leads to concerns about the sensitivity of the survey to detect trends. In addition, these trend declines may not be indicative of actual changes in populations, but rather an index to unmated males in the breeding population, changes in habitat along standardized survey routes, or a wide range of other factors. Although uncertain in some respects, these data provide a useful and generalized picture of relative population trends for use in providing hunting forecast, etc. These uncertain data, however, show the need for improving the reliability of the information used in the harvest management decision making process (i.e., establishing and changing hunting regulations). This was the primary motivation for the establishment and approval of the National Mourning Dove Harvest Management Plan adopted by all flyway councils and the International Association of Fish and Wildlife Agencies, and the emerging and ongoing national mourning dove banding and wing collection programs.

MONITORING DOVE SHOOTING FIELD MANAGEMENT

Mourning doves can provide abundant hunting opportunities close to where urban residents live. Unlike other game animals that require relatively large areas of habitat for hunting, dove shooting field management can routinely occur on sunflower fields ranging in size from 5–30 acres. However, considerable uncertainty exists concerning mourning dove harvest management strategies; e.g., half day vs. all day hunting, large daily harvests in relatively short periods vs. small daily harvests spread out over a longer interval.

To address this range of management questions, biologists from several conservation areas with active dove shooting management programs met in July, 2000 to develop a long-term Adaptive Resource Management (ARM) process; the program was expanded to include additional areas in 2003. The ARM process works best with management problems such as this one because the problem is small enough to explicitly define, and develop a meaningful and efficient monitoring program. Thus, the overall goal of the ARM program is learn how different dove management strategies impact our objective of maximizing dove hunting opportunities on public areas. To monitor our success in meeting our objective, we are collecting information on various harvest related metrics (Table 3). As a part of the monitoring program, dove hunters on these areas are required to report the number of doves killed, shots fired, hours hunted, zip code (to obtain distance traveled to hunt), and number doves shot but not retrieved. Data obtained from 8 conservation areas during 2005 showed that many dove hunters likely enjoyed the opportunity to see and shoot at numerous doves regardless of their ability to actually harvest and take home some birds (Figure 7). Also, most dove hunters hunting on the 8 managed areas traveled a median distance of 13.4 – 46.7 miles to hunt doves (Figure 8), and most hunted ≤4 hours (Figure 9). Similar to last fall, an orange-colored daily hunting card will be mandatory for dove hunters on these areas to help collect the necessary information to meet the objectives of this monitoring program.

It is important to note that the few areas involved in this long-term monitoring program represent just a few of the numerous mourning dove hunting opportunities on public areas found in Missouri. The Department provides managed mourning dove hunting opportunities on approximately 5,000 acres located on 150 fields located on over 90 public conservation areas scattered around the state. Check the public web sometime after the middle of August to locate the locations of managed areas near you (http://www.mdc.mo.gov/).

MOURNING DOVE RESEARCH UPDATE

National Pilot Banding Study

To improve future harvest management decisions at the national, regional, and statewide levels, population information is needed to make better informed decisions. New population models are being constructed using existing historical data to help make more informed harvest management strategies and to illustrate which pieces of new population information are most critical. Efforts are also underway to initiate a national mourning dove banding program to obtain modern information on band reporting rates and harvest rates for use in the population models, which in turn will be used making decisions about future changes in hunting regulations. To date, these efforts have received wide spread support (e.g., flyway technical committees, flyway councils, joint flyway councils, and the AFWA subcommittees and its working groups). Missouri is banding doves on 11 areas, and attaching bands to almost 2,500 birds annually.

Hunters that shoot and retrieve banded birds are asked to call **1-800-327-BAND (2263)**. Hunters will be asked by the operator to provide the band number, the location where the bird was killed, and the date when the bird was killed. By reporting band numbers dove hunters will be helping to manage our dove resource for future generations.

Wing Survey and Recruitment

The National Dove Plan recognizes the need for mourning dove recruitment information. Recruitment indices for other migratory game birds are obtained from wing collections conducted by mail survey. However, annual printing and postage costs for these surveys are high. Collecting mourning dove wings from check stations at managed hunting areas is an alternative, less expensive way to collect large samples of wings. The samples from these areas, however, would have less extensive geographic distribution than a sample derived from a traditional mail wing survey. Thus, check station samples may not be as representative as samples from a mail survey. A 3-year study, therefore, has been initiated to collect samples of wings using the 2 different collection methods, compare state-level and management unit-level estimates of age ratios derived from the 2 methods, and provide a cost comparison. The results of this project will enable us to determine the most cost-effective way to conduct an annual operational mourning dove wing collection survey that will provide valid indices of recruitment at the desired geographic scale. This project will also help us determine appropriate sample sizes for the survey. Other research is underway to calibrate these indices to actual estimates of recruitment (see Agroforestry Mourning Dove Project Update below).

Long-term Localized Banding Study

Given the increasing popularity of dove hunting near urban areas, local dove harvests and associated intensity of managing sunflower fields have increased substantially on numerous conservation areas. Managers and biologists, however, have limited knowledge of how these locally intensive harvests effect populations. For example, what subpopulations or subgroups of mourning doves are harvested on these areas; locally established populations or different migratory subpopulations passing through the area? What are some plausible explanations for observed annual fluctuations in year-to-year harvests on these managed areas?

Using a collaborative effort between research and management staff to address these issues, a long-term banding study (>10-years) was initiated in 2000 at the James A. Reed Memorial Wildlife Area. Trapping annually occurs during the summer (July 1 – August 21) and winter (January 1 – February 28); 1,000 doves are the target sample size for each trapping session. It will be several years before any meaningful conclusions can be made.

Mourning Doves and Lead (Pb) Shot Research

Pb Pellet Deposition and Availability

Abstract: Mourning dove hunting is becoming increasingly popular, especially hunting over managed shooting fields. Given the possible increase in lead (Pb) shot availability on these conservation areas, we estimated availability and ingestion of spent shot at the Eagle Bluffs Conservation Area (EBCA; hunted with nontoxic shot) and the James A. Reed Memorial Wildlife Area (JARWA; hunted with Pb shot) in Missouri. During 1998, we collected soil samples 1–2 weeks prior to the hunting season (prehunt) and after 4 days of dove hunting (posthunt). We also collected information on number of doves harvested, number of shots fired, shotgun gauge, and shotshell size used. Dove carcasses were collected on both areas during 1998-99. At EBCA, 60 hunters deposited an estimated 64,775 pellets/ha of nontoxic shot on or around the managed field. At JARWA, approximately 1,086,275 pellets/ha of Pb shot were deposited by 728 hunters. Our posthunt estimates of spent shot availability from soil sampling were 0 pellets/ha for EBCA and 6,342 pellets/ha for JARWA. Our findings suggest that existing soil sampling protocols may not provide accurate estimates of spent shot availability in managed dove shooting fields. During 1998-99, 15 of 310 (4.8%) mourning doves collected from EBCA had ingested nontoxic shot. For doves that ingested shot, 6 (40.0%) contained ≥7 shot pellets. In comparison, only 2 of 574 (0.3%) doves collected from JARWA had ingested Pb shot. Because a greater proportion of doves ingested multiple steel pellets compared to Pb pellets, we suggest that doves feeding in fields hunted with Pb shot may succumb to acute Pb toxicosis and thus become unavailable to harvest, resulting in an underestimate of ingestion rates. Although further research is needed to test this hypothesis, our findings may partially explain why previous studies have shown few doves with ingested Pb shot despite feeding on areas with high Pb shot availability. Funding and support for this study were provided by the Missouri Department of Conservation's Conservation Research Center (Federal Aid in Wildlife Restoration Project W-13-R), and the University of Missouri's Department of Fisheries and Wildlife Sciences. (Full details available in Wildlife Society Bulletin 2002, 30(1):112-120)

Acute Lead (Pb) Toxicosis

Abstract: Previous research has suggested that free-ranging mourning doves may ingest spent lead pellets, succumb to lead toxicosis, and die in a relatively short time period (i.e., an acute lead toxicosis hypothesis). We tested this hypothesis by administering 157 captive mourning doves 2–24 lead pellets, monitoring pellet retention and short-term survival, and measuring related physiological characteristics. During the 19–21-day post-treatment period, 104 doves that received lead pellets died (deceased doves) and 53 survived (survivors); all 22 birds in a control group survived. Within 24-hr of treatment, blood lead levels increased almost twice as fast for deceased doves compared to survivors ($P < 0.001$). During the first week, heterophil:lymphocyte (H:L) ratios increased twice as fast for deceased doves than with survivors ($P < 0.001$). Post-treatment survival differed ($P < 0.001$) among the five groups of doves that retained different numbers of pellets, and survival ranged from 0.57 (95% CI: 0.44–0.74) for doves that retained ≤2 lead pellets 2-days post-treatment compared to 0.08 (95% CI: 0.022–0.31) for those doves that retained 13–19 lead pellets on 2-days post-treatment; significant differences existed among the five groups. After controlling for dove pre-treatment body mass, each additional lead pellet increased the hazard of death by 18.0% (95% CI: 1.132–1.230, $P < 0.001$) and 25.7% (95% CI: 1.175–1.345, $P < 0.001$) for males and females, respectively. For each 1 g increase in pre-treatment body mass, the hazard of death decreased 2.5% ($P = 0.04$) for males and 3.8% ($P = 0.02$) for females. Deceased doves had the highest lead levels in liver (49.20 ± 3.23 ppm) and kidney (258.16 ± 21.85 ppm) tissues, whereas controls showed the lowest levels (liver, 0.08 ± 0.041 ppm; kidney, 0.17 ± 0.10 ppm).

For doves dosed with pellets, we observed simultaneous increases in blood lead levels and H:L ratios, whereas packed-cell volume (PCV) values declined. Our results support an acute lead toxicosis hypothesis. Although further research is necessary to investigate the magnitude of lead shot ingestion and toxicosis in mourning doves, we recommend that management agencies initiate development of a long-term strategic plan aimed at implementing a nontoxic shot regulation for mourning dove hunting. Funding and support for this study were provided by the Missouri Department of Conservation's Resource Science Center, and the University of Missouri's Department of Fisheries and Wildlife Sciences and Veterinary Medicine Diagnostic Laboratory. All animal care and use during these experiments were approved by the University of Missouri Animal Care and Use Committee (Full details available in Journal of Wildlife Management 70(2):413–421).

Experimental Lead Pellet Ingestion In Mourning Doves

Abstract: Because the relationship between lead pellet availability and ingestion by mourning doves remains uncertain, we conducted an experiment to determine if doves held in captivity freely ingest lead shotgun pellets, investigate the relationship between pellet density and ingestion, and monitor physiological impacts of doves ingesting pellets. We conducted two trials of the experiment with <60 doves per trial. We randomly assigned 10 doves to one of six groups per trial; 10, 25, 50, 100, 200 pellets mixed with food and a control group with no pellets. We monitored ingestion by examining x-rays of doves 1-day post-treatment, and monitored the effects of lead ingestion by measuring heterophil:lymphocyte (H:L) ratios, packed-cell volume (PCV), blood lead, liver lead, and kidney lead. Pooled data from both trials showed 6 of 117 (5.1%) doves ingested lead pellets. Two mourning doves ingested multiple lead pellets in each of the treatments containing a mixture of 25, 100, and 200 lead pellets and food. Doves ingesting lead pellets had higher blood lead levels than before treatment ($P = 0.031$). Post-treatment H:L ratios, however, were not different compared to pre-treatment values ($P = 0.109$). Although post-treatment PCV decreased for 4 of 6 doves ingesting lead pellets, overall they were not lower than their pre-treatment values ($P = 0.344$). Liver ($P < 0.0001$) and kidney ($P = 0.0012$) lead levels for doves ingesting pellets were higher than doves without ingested pellets. Our lead pellet ingestion rates were similar to previously reported ingestion rates from hunter-killed doves, and our physiological measurements confirm earlier reports of a rapid and acute lead toxicosis. Similar to previous field research, we did not observe a relationship between pellet density in the food and *ad libitum* pellet ingestion. Although one approach would be to ban lead shot for mourning dove hunting on managed public hunting areas, further research is necessary to ensure that policy development and implementation have a consensus among stakeholders. (Manuscript in review process in the journal called American Midland Naturalist)

Small Game Hunter Attitudes Towards Nontoxic Shot

Abstract: Besides waterfowl, wildlife managers are becoming more concerned about the exposure of birds to spent lead shot. Knowledge of hunter attitudes and their acceptance of nontoxic shot regulations will be important in establishing new regulations. Our objective was to assess the attitudes of small game hunters in Missouri towards a nontoxic shot regulation for small game hunting in general, and specifically for mourning doves. Most hunters (71.7–84.8%) opposed additional nontoxic shot regulations. Hunters from rural areas, hunters with a rural background, hunters who hunt doves, hunters who currently hunt waterfowl, hunters who primarily used private lands, and current upland game hunters were more likely to oppose new regulations. For mourning dove hunting, most small game hunters (81.1%) opposed further restrictions; however, many non-dove hunters (57.1%) expressed "no opinion." Because our results demonstrate that most small game and dove hunters in Missouri are decidedly against further nontoxic shot regulations, any

informational and educational programs developed to accompany future policy changes must address there concerns. Funding and support for this study were provided by the Missouri Department of Conservation's Resource Science Center, and the University of Missouri's Department of Fisheries and Wildlife Sciences. (Full details available in Wildlife Society Bulletin 2006, 34: In-press)

Nontoxic Shot and Crippling Rates

Abstract: Increasing concerns about the exposure of mourning doves to spent lead shot may lead to a review of lead shot restrictions. Policy reviews regarding current restrictions likely will involve debates about whether nontoxic shot requirements will result in increased crippling loss of mourning doves. We evaluated waterfowl crippling rates in the United States prior to, during, and after implementation of nontoxic shot regulations for waterfowl hunting. We used this information to make inferences about mourning dove crippling rates if nontoxic shot regulations are enacted. We found differences in moving average crippling rates among the 3 treatment periods for ducks ($P < 0.001$, $n = 49$). Prenontoxic-shot-period crippling rates were lower than 5-year phase-in period crippling rates ($P = 0.043$) but higher ($P < 0.001$) than nontoxic-shot-period crippling rates. Similarly, we observed differences in moving average crippling rates among the 3 treatment periods for geese ($P < 0.001$, $n = 49$). Prenontoxic-shot- and 5-year-phase-in-period crippling rates were both greater than ($P < 0.001$) nontoxic-shot-period crippling rates but did not differ from one another ($P = 0.299$). Regardless of why the observed increases occurred in reported waterfowl crippling rates during the phase-in period, we believe the decline that followed full implementation of the nontoxic shot regulation is of ultimate importance when considering the impacts of lead shot restrictions for mourning doves. We argue that long-term mourning dove crippling rates might not increase as evidenced from historical waterfowl data. Funding and support for this investigation were provided by the Missouri Department of Conservation's Resource Science Center, and the University of Missouri's Department of Fisheries and Wildlife Sciences and Veterinary Medicine Diagnostic Laboratory. (Full details available in Wildlife Society Bulletin 2006, 34: In-press)

Agroforestry and Mourning Dove Research Update

The future of dove management depends primarily upon harvest management and our understanding of how harvest affects dove populations. As outlined in the National Dove Plan, long-term dove harvest management decisions must be based upon mechanistic population models in hopefully ≥5 years after implementation of the interim Central Management Unit (CMU) harvest management strategy, and the models will require modern estimates of demographic characteristics (e.g., recruitment, survival). Therefore, a key and implicit objective of the agroforestry/dove recruitment project is to obtain estimates of annual recruitment for development of reproduction models that can eventually be coupled with survival models to produce a set of population models for use in harvest management of mourning doves.

In the context of the changes in anticipated future harvest management decisions for mourning doves, recruitment estimates obtained from radio marked HY individuals would become one of the critical elements used in the population models along with estimates of age-specific annual survival, and harvest rates, and critical in understanding and interpreting data from wing collection surveys. Recruitment estimates and associated annual variation obtained from field observation of radio marked birds will provide an additional and independent validation of recruitment estimates generated from change-in-ratio estimators from wing collection surveys. The parameter *number of birds shot and not retrieved* will provide a local estimate of reported crippling rate. These data will be compared with reported crippling rates from HIP and historical crippling rates from observation studies (e.g., *spy blinds*). Given crippling estimates obtained from our radio marked

doves, we'll have an opportunity to compared and calibrate reported and observed crippling rates with actual or *real* crippling rates of bird shot and not retrieved (e.g., see Table 3). Given our ability to remotely monitoring the presence/absence of radio marked doves, we'll be able to estimate daily harvest rates.

Despite the benefits directly related to mourning dove hunting opportunities at the national and regional level, no experiments have evaluated the efficacy of different sizes and configurations of sunflower plantings to attract and concentrate mourning doves for harvest at the local level. The size, location, and arrangement of sunflower fields will be experimentally evaluated to determine possible relationships to hunting opportunity, harvest, and harvest rates. This will have an immediate and direct benefit to MDC land managers engaged in mourning dove shooting field management.

In early April 2005, we planted 1,448 trees in two experimental agroforestry plots on the James A. Reed Memorial Wildlife Area. These plots will be used to determine optimum and effective field size for establishing mourning dove shooting fields. This is the second field season of a 5-6 year project.

Table 1. Estimates of the number of dove hunters, days afield, and total harvest by state in the Central Management Unit (CMU; Figure 2) from the Migratory Game Bird Harvest Information Program (HIP) survey for the 2005-06 hunting season.

	HARVEST		HUNTERS		DAYS	
Arkansas	861,600	(± 20%)[1]	43,400	(± 15%)	147,300	(± 24%)
Colorado	263,400	(± 10%)	18,400	(± 7%)	48,700	(± 9%)
Kansas	680,400	(± 11%)	32,400	(± 8%)	109,500	(± 12%)
Minnesota	48,800	(± 61%)	6,000	(± 34%)	14,700	(± 43%)
Missouri	641,800	(± 20%)	40,200	(± 10%)	113,400	(± 16%)
Montana	17,800	(± 44%)	2,000	(± 34%)	4,800	(± 38%)
Nebraska	371,100	(± 15%)	17,800	(± 10%)	64,300	(± 14%)
New Mexico	250,100	(± 22%)	9,300	(± 17%)	42,000	(± 20%)
North Dakota	55,500	(± 48%)	3,100	(± 27%)	11,800	(± 38%)
Oklahoma	828,500	(± 20%)	34,500	(± 9%)	111,500	(± 16%)
South Dakota	127,700	(± 28%)	7,100	(± 18%)	25,200	(± 26%)
Texas	5,710,700	(± 15%)	257,200	(± 10%)	1,030,000	(± 13%)
Wyoming	34,100	(± 31%)	2,500	(± 27%)	6,600	(± 27%)
CMU Total	9,891,400	(± 9%)	473,900[2]		1,729,800	(± 8%)

[1]This represents the 95% confidence interval expressed as percent of the point estimate.

[2]This total may be slightly exaggerated because some people may be counted more than once if they hunted in more than one state, and explains why there is no estimated confidence interval.

Table 2a. Percent change of the 2006 Roadside Mourning Dove Survey relative to 2005, 5-year (2001–05), and 10-year (1996–05) averages by Zoogeographic regions (Figure 1a).

Zoogeographic Regions	2006 Index[a]	2-Year (2005 – 06) % Change	5-Year (2001 – 05) % Change	10-Year (1996 – 05) % Change
Northwest Prairie (9)[b]	2.01	9.7	17.1	22.5
Northern Riverbreaks (11)	1.32	2.2	-6.6	3.7
Northeast Riverbreaks (20)	1.68	49.0	27.3	36.5
Western Prairie (12)	2.18	55.7	38.9	24.6
Western Ozark Border (13)	2.25	44.8	52.9	52.7
Ozark Plateau (24)	0.74	5.7	29.5	28.3
Northern and Eastern Ozark Border (12)	1.06	12.4	7.3	1.2
Mississippi Lowlands (7)	2.99	43.2	11.4	21.6
STATEWIDE (108)	1.60	29.0	29.4	54.3

[a]Survey index is equal to the number of mourning doves observed per mile.
[b]Number of counties within zoogeographic region with a completed and returned survey route.

Table 2b. Percent change of the 2006 Roadside Mourning Dove Survey relative to 2005, 5-year (2001–05), and 10-year (1996–05) averages by MDC Management regions (Figure 1b).

MDC Management Regions	2006 Index[a]	2-Year (2005 – 06) % Change	5-Year (2001 – 05) % Change	10-Year (1996 – 05) % Change
Northwest (17)[b]	1.68	2.4	2.4	40.0
Northeast (15)	1.56	41.1	26.8	38.1
Kansas City (10)	2.58	88.3	46.6	74.3
Central (15)	1.74	40.3	47.0	74.0
St. Louis (6)	0.71	82.0	10.9	-21.1
Southwest (17)	1.74	17.6	46.2	59.6
Ozark (12)	0.69	-5.5	25.5	35.3
Southeast (16)	1.69	33.1	4.3	5.4
STATEWIDE (108)	1.60	29.0	29.4	54.3

[a]Survey index is equal to the number of mourning doves observed per mile.
[b]Number of counties within zoogeographic region with a completed and returned survey route.

Table 3. Dove harvest characteristics during September 2005 from conservation areas cooperating with an Adaptive Resource Management (ARM) program to evaluate the effects of different hunter and harvest management strategies on the goal of maximizing hunting opportunities[1].

Area	Number of Hunters	Doves Killed	Shots Fired	Hours Hunted	Doves Shot and Not Retrieved
A. A. Busch CA	1,040	2,898	15,893	3,242	577
Bois D'Arc CA	729	2,521	15,197	2,267	*
Columbia Bottom CA	1,338	7,179	31,998	4,146	1,108
Otter Slough CA	110	607	2,264	285	130
Pony Express CA	784	5,115	25,979	2,238	683
J. A. Reed Mem. WA	1,425	7,426	39,599	2,598	1,267
R. E. Talbot CA	417	1,705	8,227	1,258	379
Ten Mile Pond CA	336	2,599	9,569	779	275
TOTAL	6,179	30,050	148,726	16,813	4,419

[1]It is important to note that these areas represent just a few dove hunting opportunities on public areas, and are part of a long-term management experiment. The Department provides managed mourning dove hunting opportunities on approximately 5,000 acres located on 150 fields located on 92 public conservation areas.

*Data unavailable.

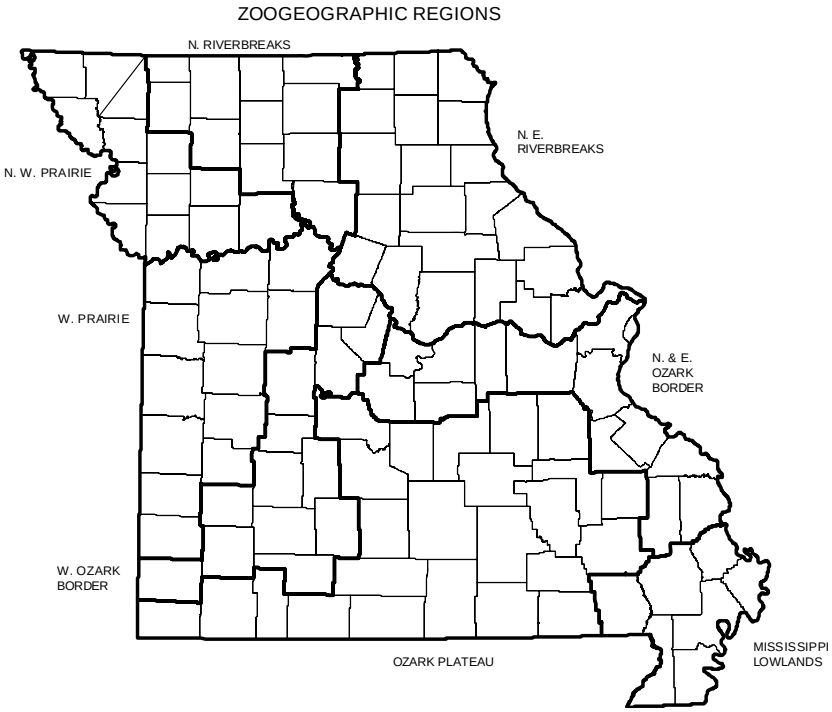

Figure 1a. Zoogeographic regions of Missouri.

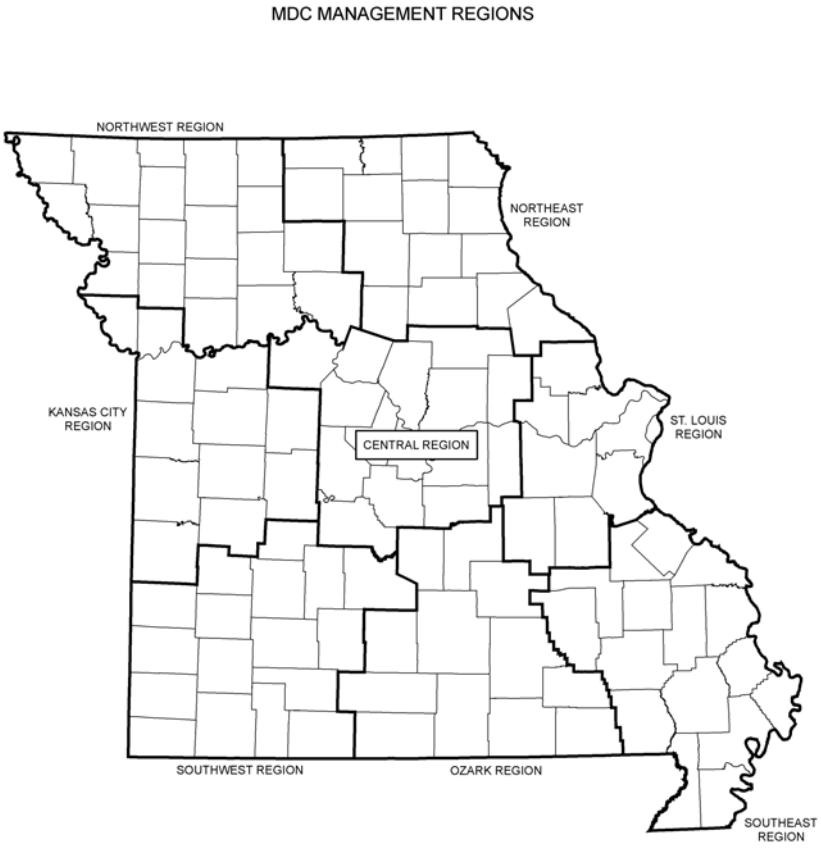

Figure 1b. MDC management regions.

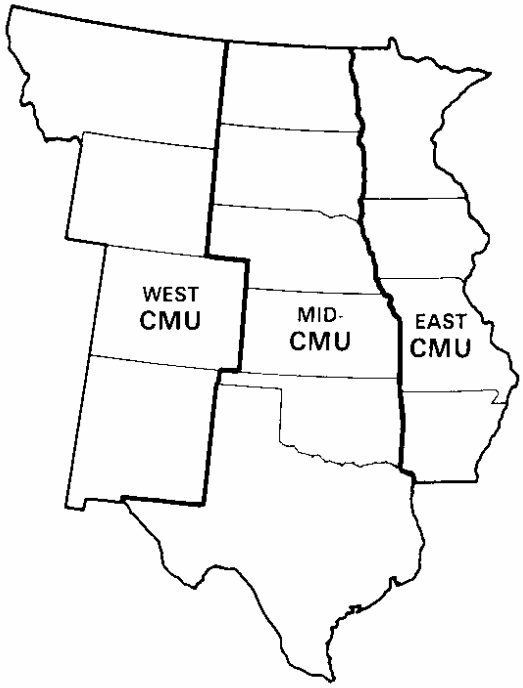

Figure 2a. The Central Management Unit (CMU) consists of 14 states containing roughly 46% of the land U.S. land area, and routinely has the highest Call-Count Survey (CCS) indices in the country.

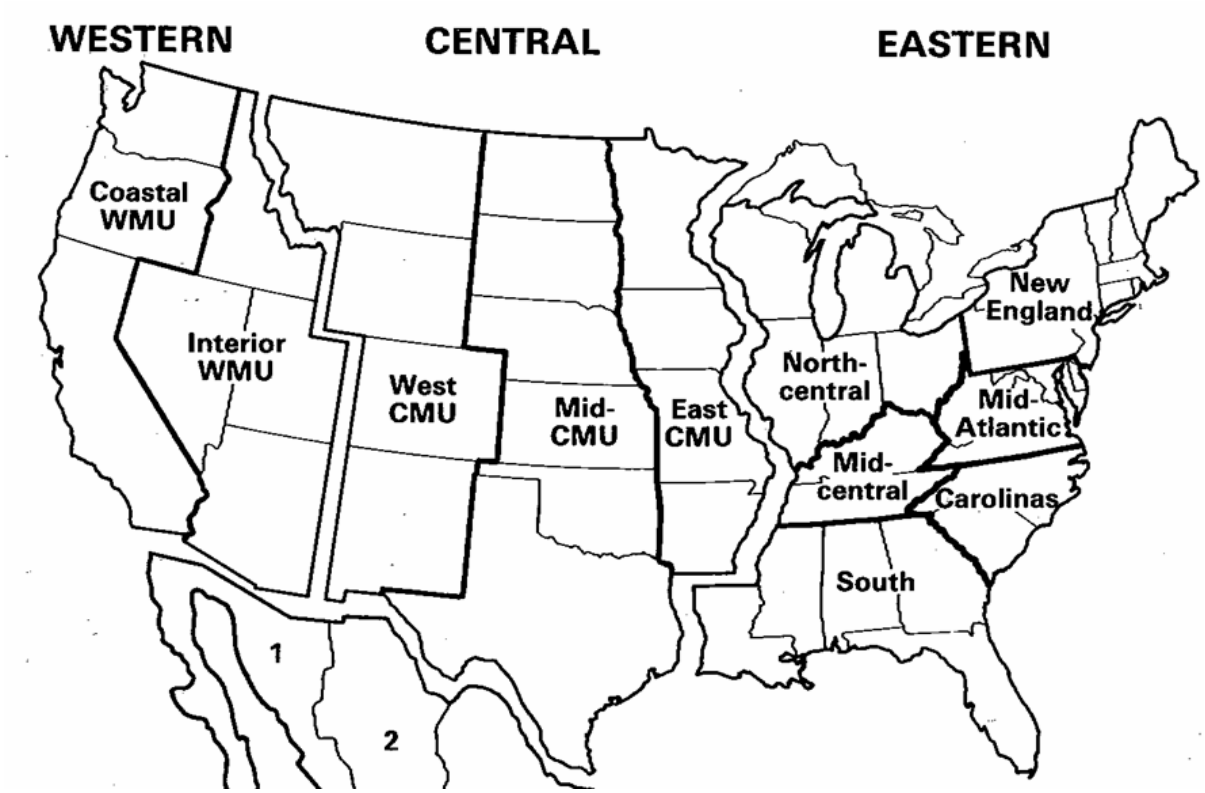

Figure 2b. Within the United States, there are 3 zones, or management units, that contain mourning dove populations that are roughly independent of each other. These zones encompass the principle breeding, migration, and U.S. wintering areas for each population. Harvest management decisions are annually established by management unit.

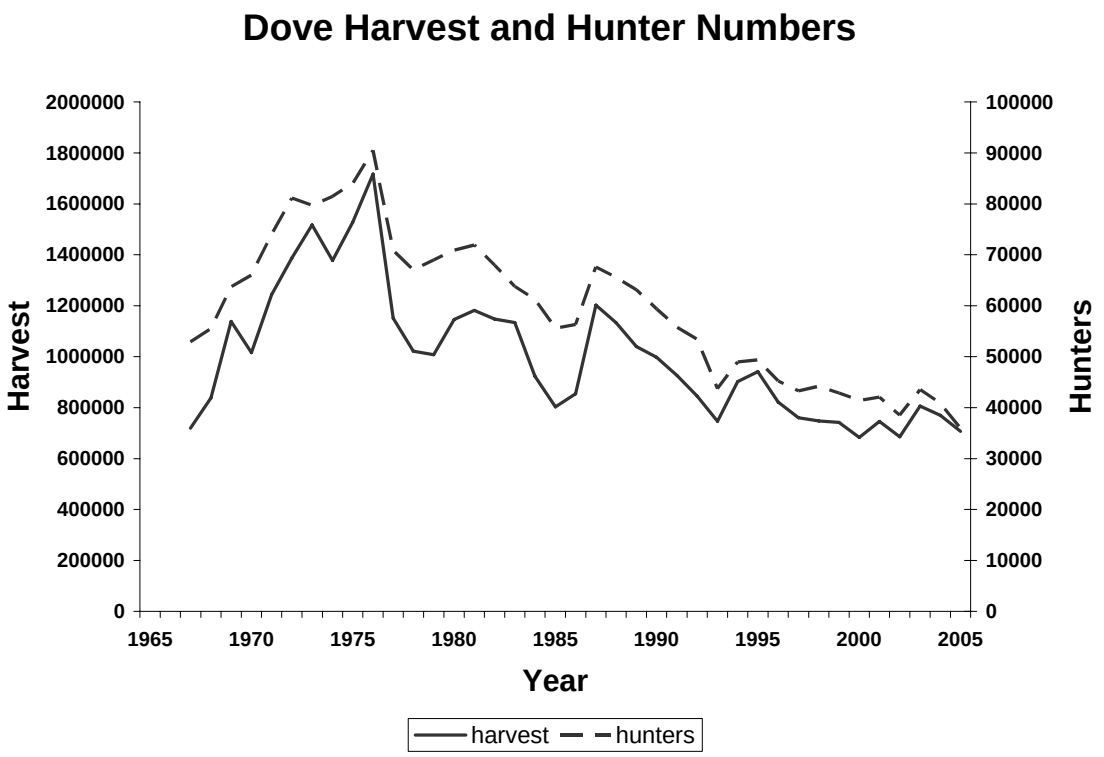

Figure 3. Long-term trends (1967– 2005) of mourning dove harvest and number of dove hunters in Missouri estimated annually by the small-game post-season harvest mail survey.

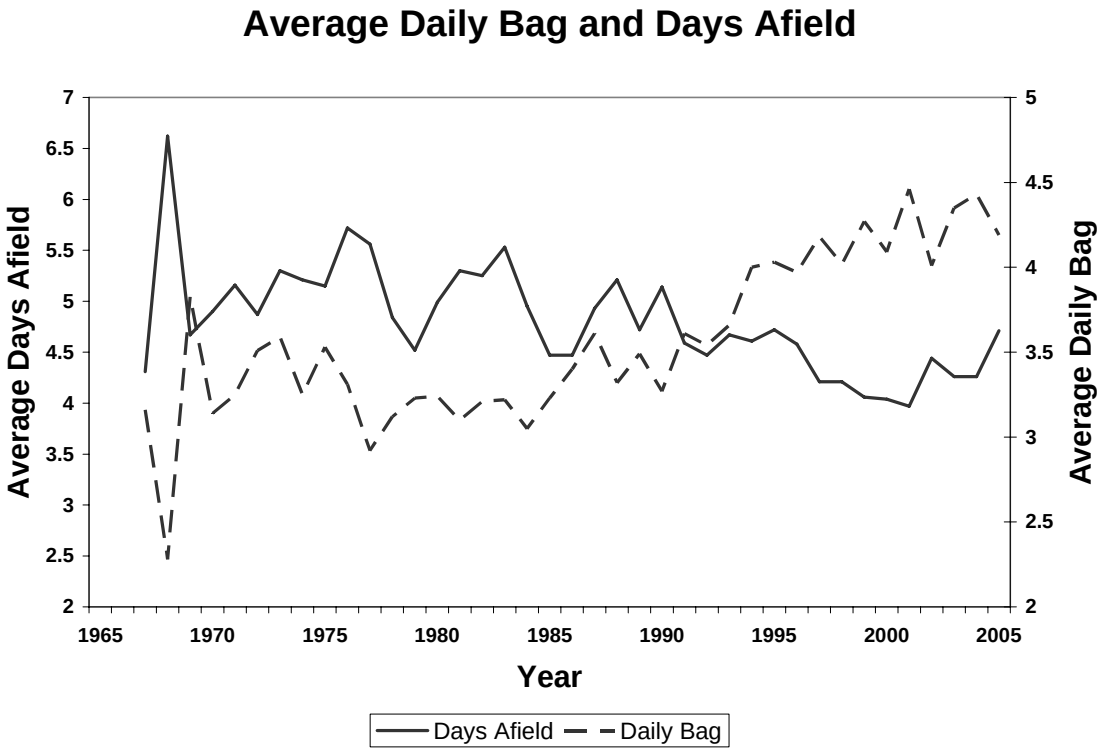

Figure 4. Long-term trends (1967–2005) of mourning dove average daily bag limit and average number of days afield for Missouri dove hunters estimated annually by the small-game post-season harvest mail survey.

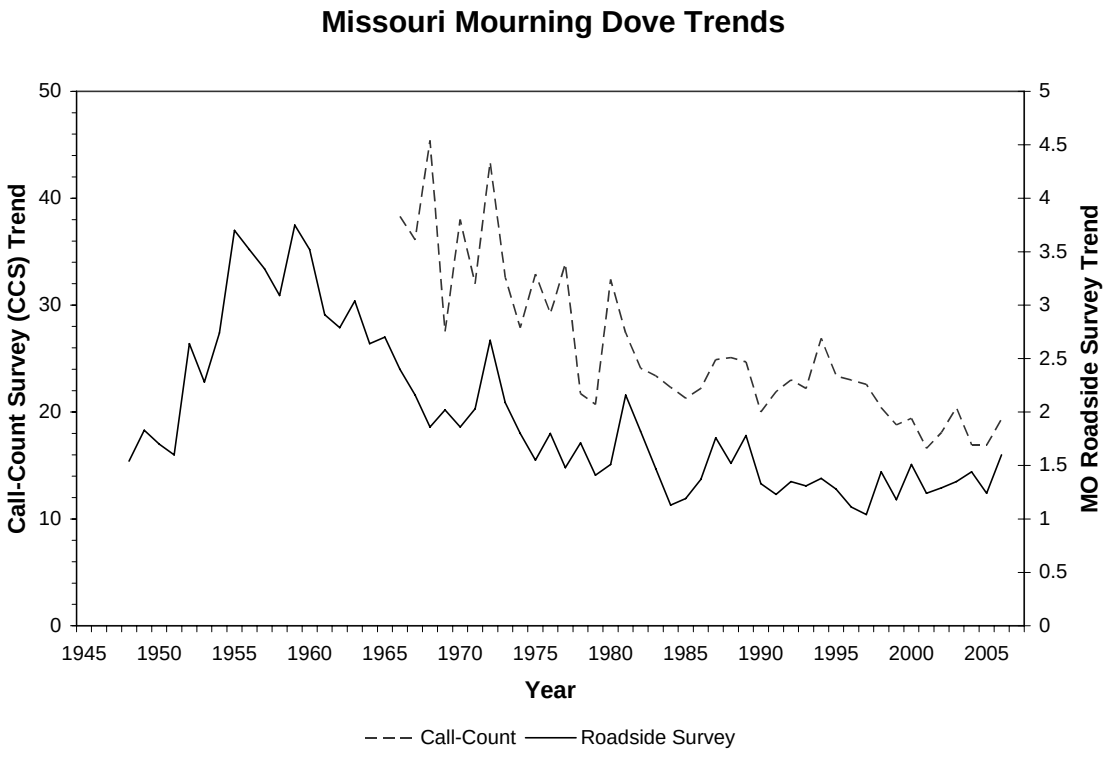

Figure 5. Missouri roadside mourning dove survey (RDS) expressed as doves/mile (1948–2006) and U.S. Fish and Wildlife Service mourning dove call-count survey (CCS) route regression trend analysis (1966–2006).

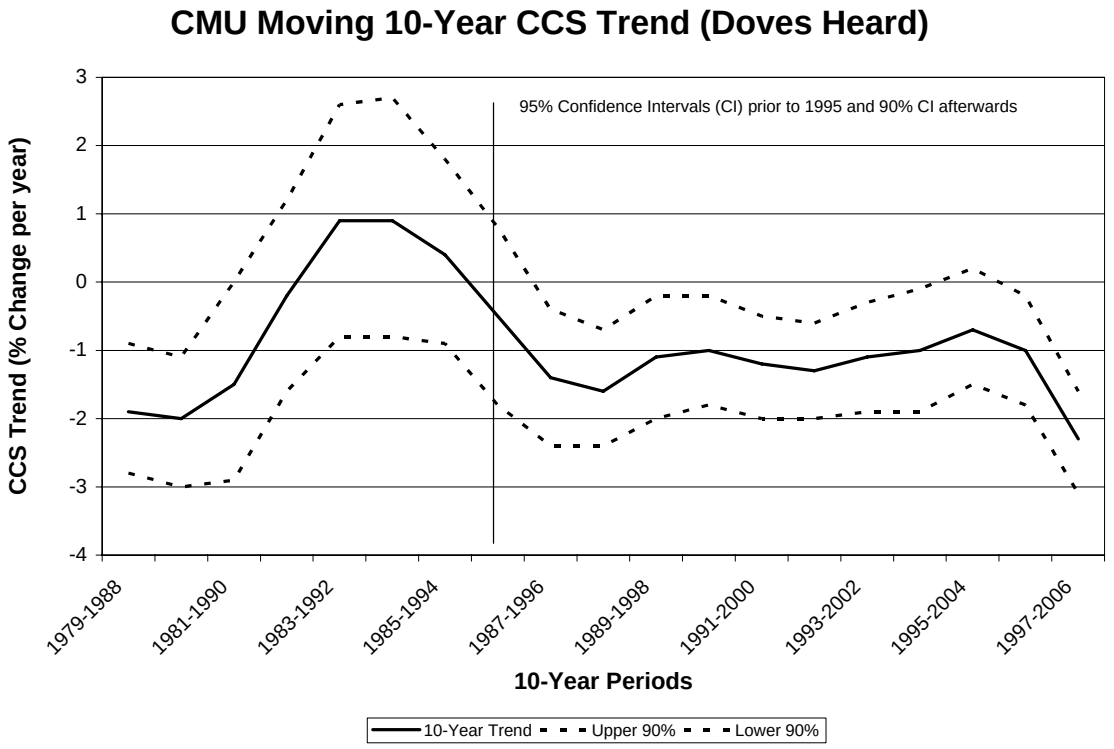

Figure 6. Moving 10-year trends (expressed at percent change per year as determined by linear regression) in number of mourning doves heard along Call-Count Survey (CCS) routes.

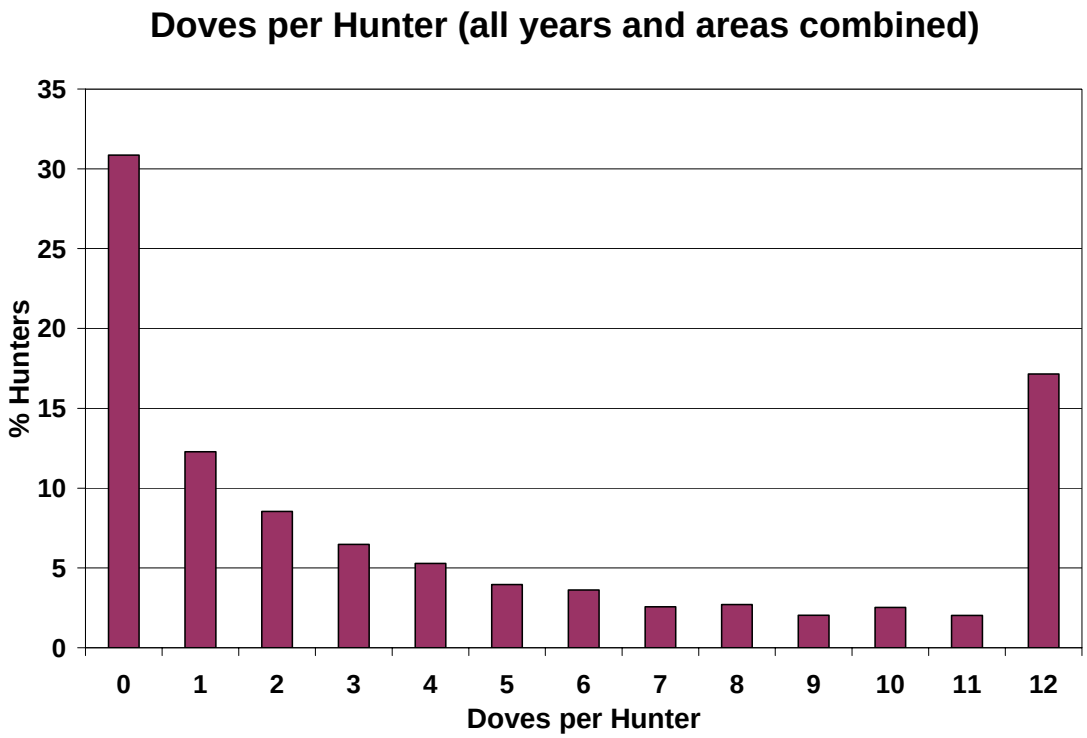

Figure 7. The proportion of dove hunters by daily bag during 1999–2005 on 8 conservation areas providing managed shooting fields (see Table 3 for specific proportions for each area during 2005).

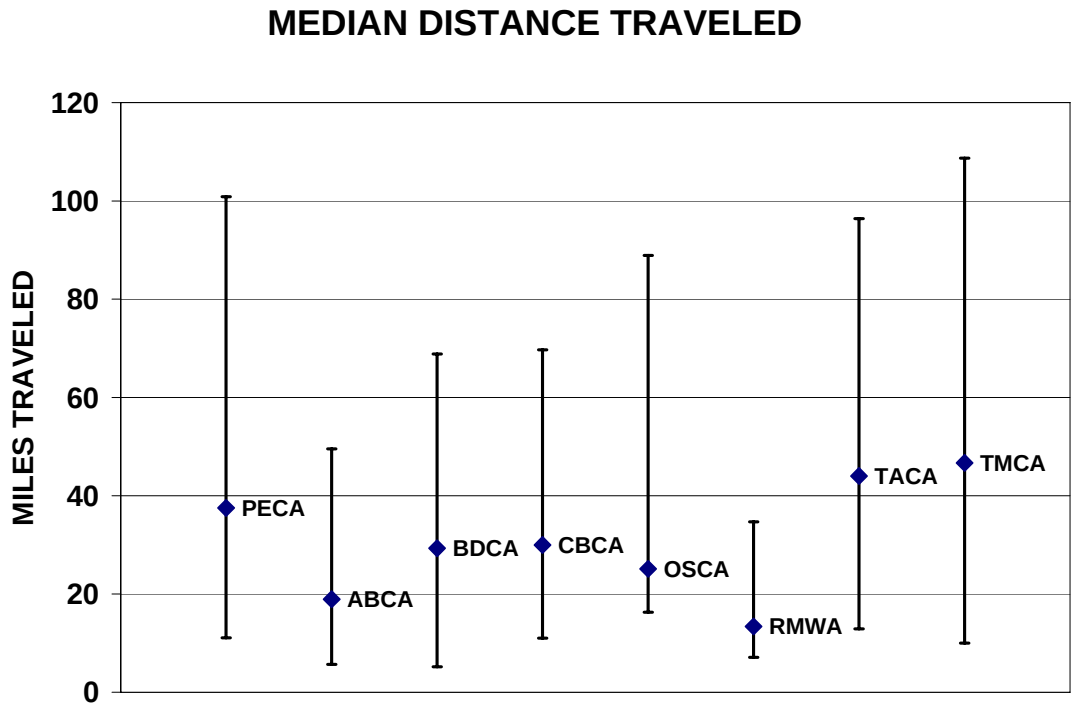

Figure 8. Median distance traveled to hunt doves (diamond; Q2) and 25th percentile (lower tick mark; Q1) and 75th percentile (upper tick mark; Q3); Pony Express Conservation Area (PECA), August A. Busch Conservation Area (ABCA), Bois D'Arc Conservation Area (BDCA), Columbia Bottom Conservation Area (CBCA), Otter Slough Conservation Area (OSCA), James A. Reed Memorial Wildlife Area (RMWA), Robert E. Talbot Conservation Area (TACA), and Ten-Mile Pont Conservation Area (TMCA).

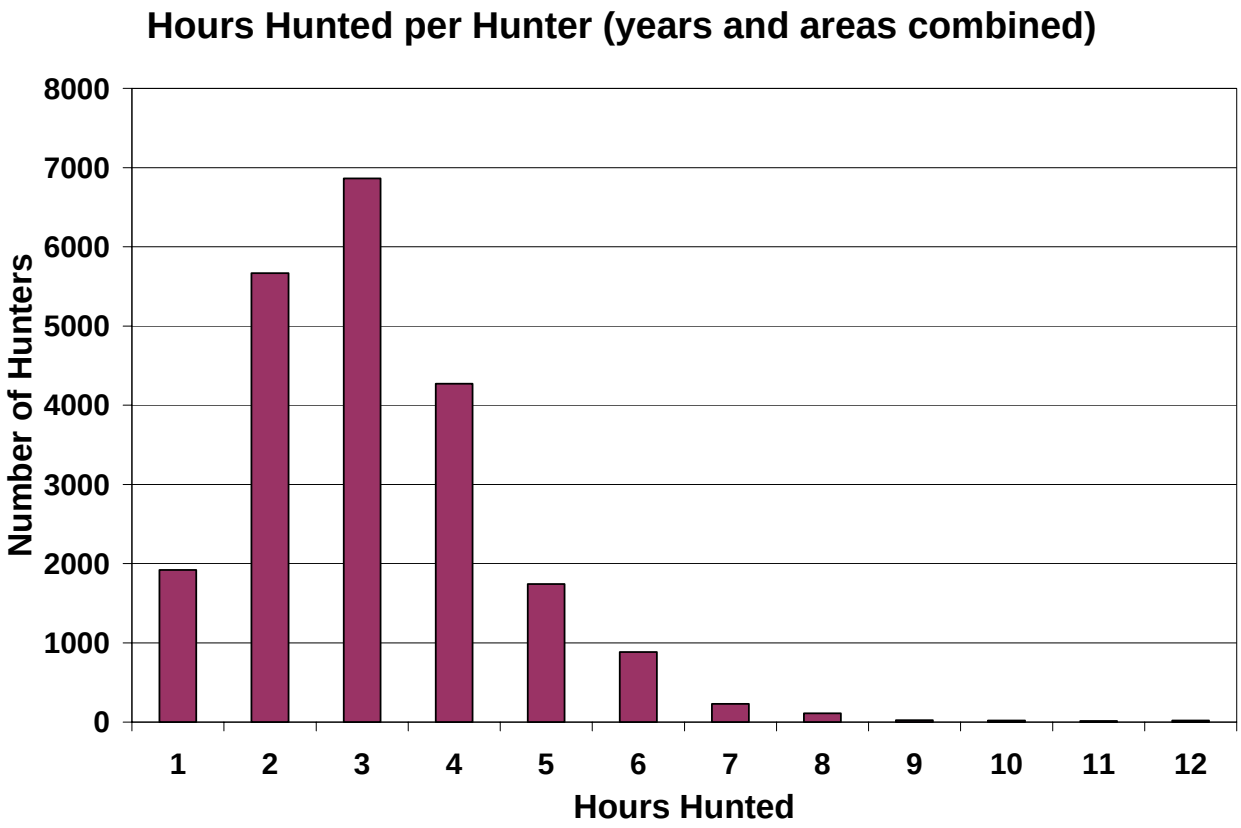

Figure 9. The number of hours hunted by dove hunters during 1999–2005 on 8 conservation areas providing managed shooting fields (see Table 3 for specific proportions for each area during 2005).

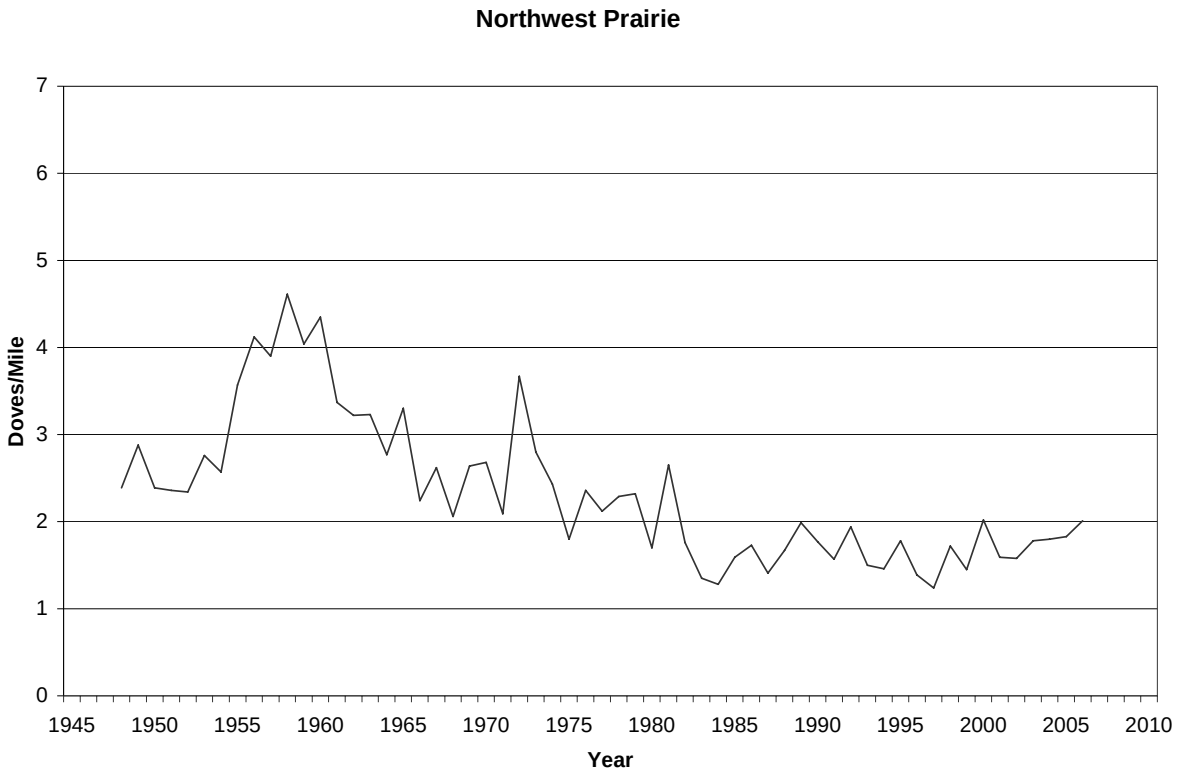

Figure 10. Northwest Prairie Zoogeographic Region.

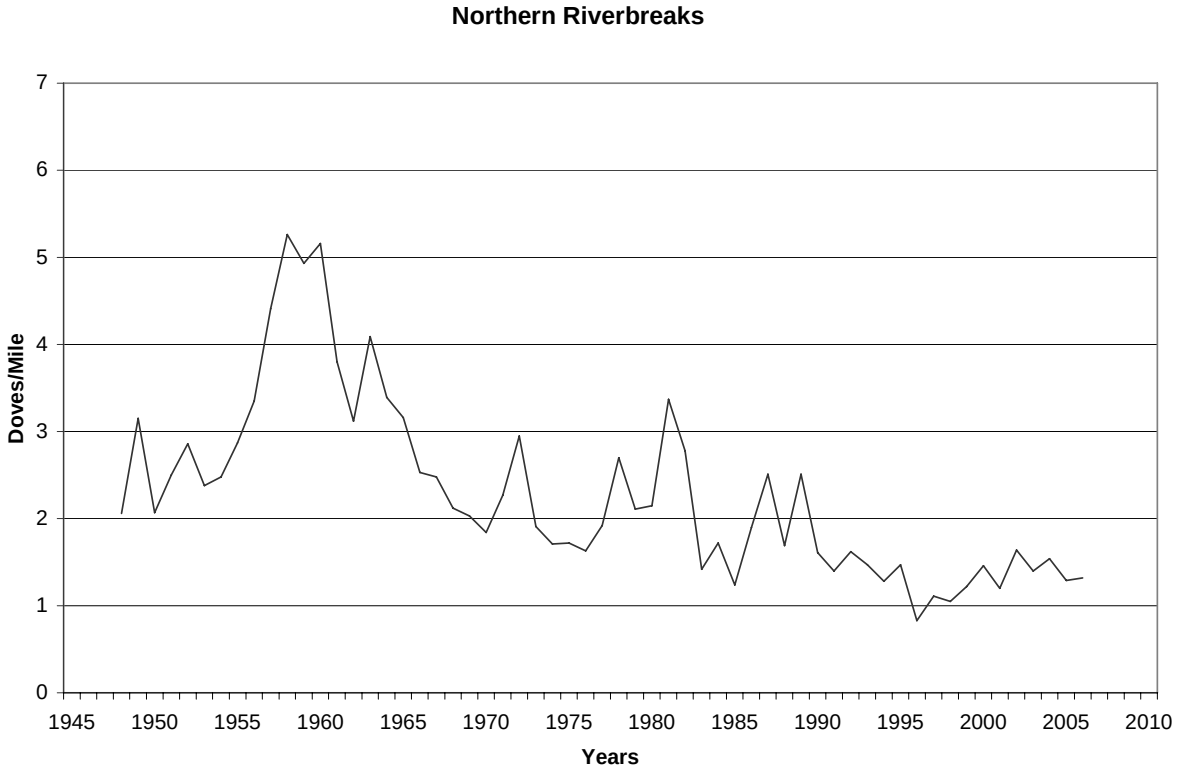

Figure 11. Northern Riverbreaks Zoogeographic Region.

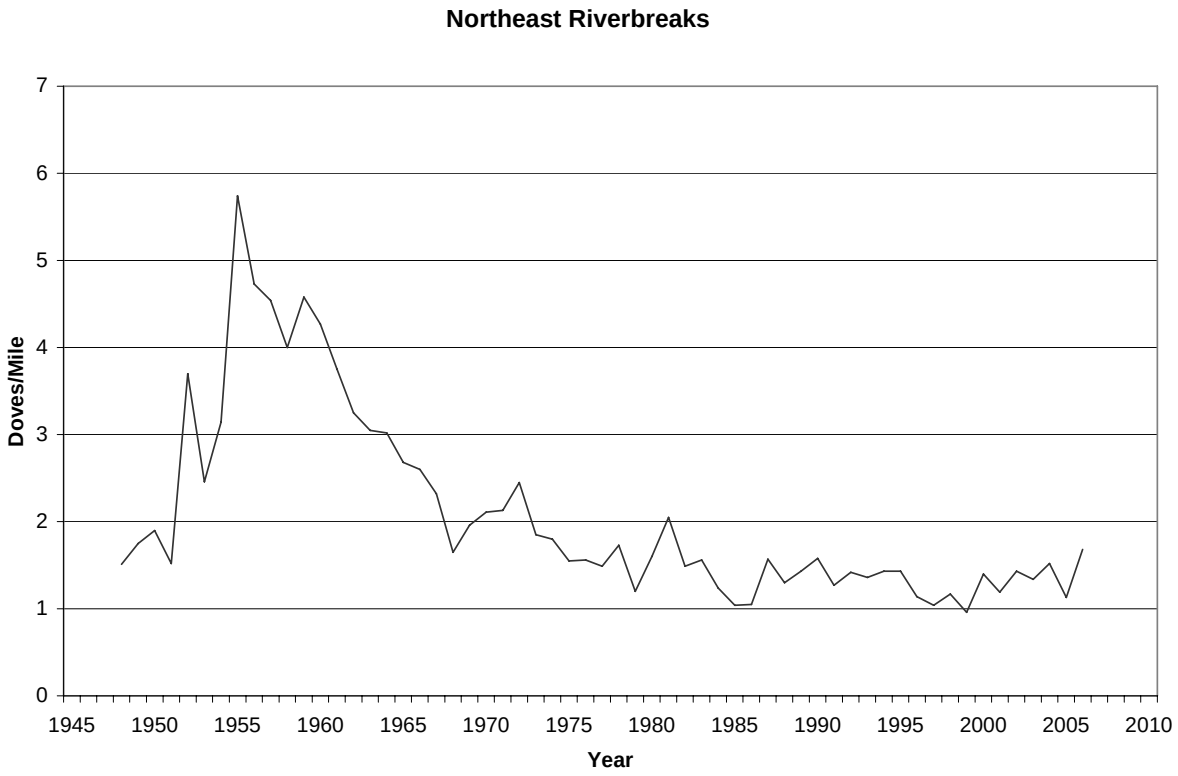

Figure 12. Northeast Riverbreaks Zoogeographic Region.

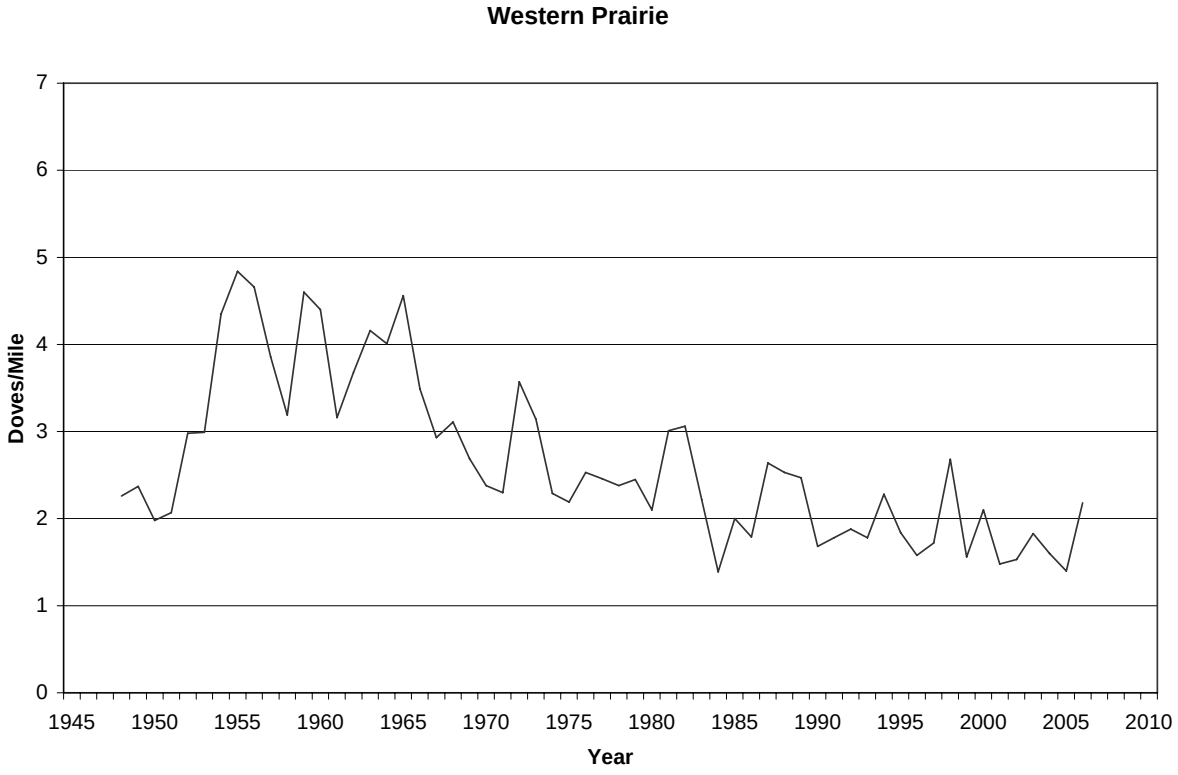

Figure 13. Western Prairie Zoogeographic Region.

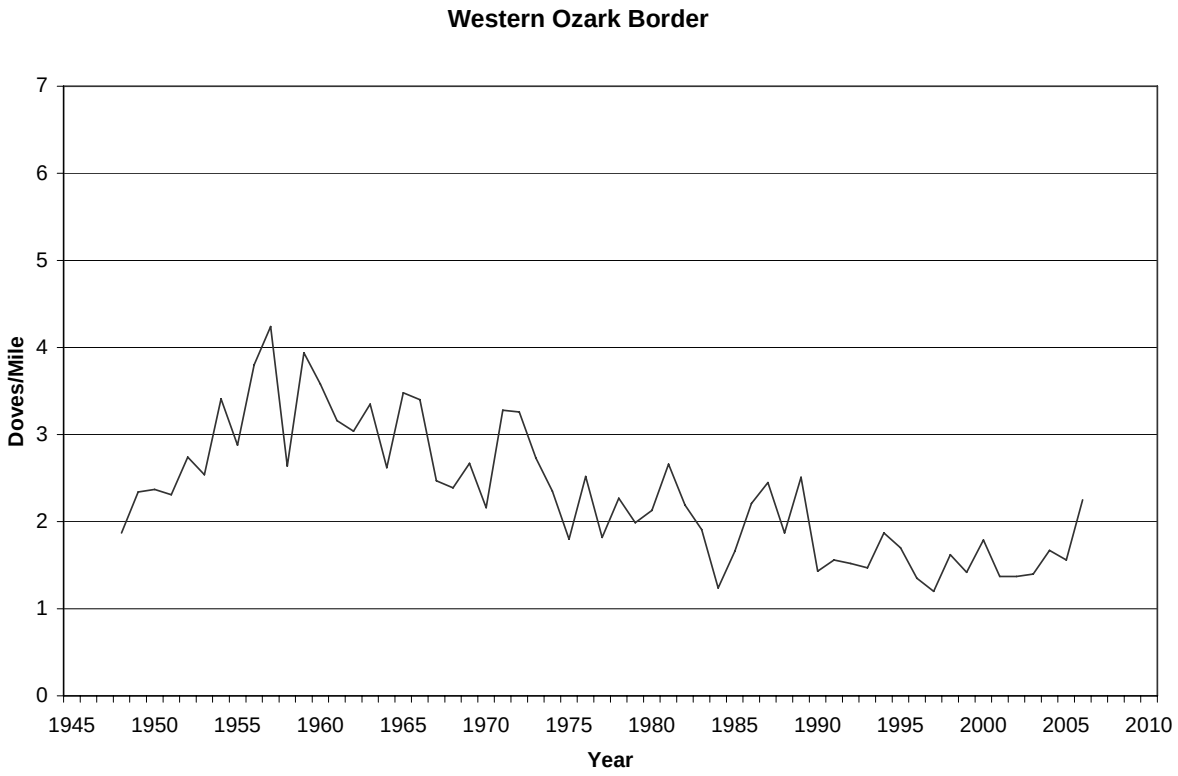

Figure 14. Western Ozark Border Zoogeographic Region.

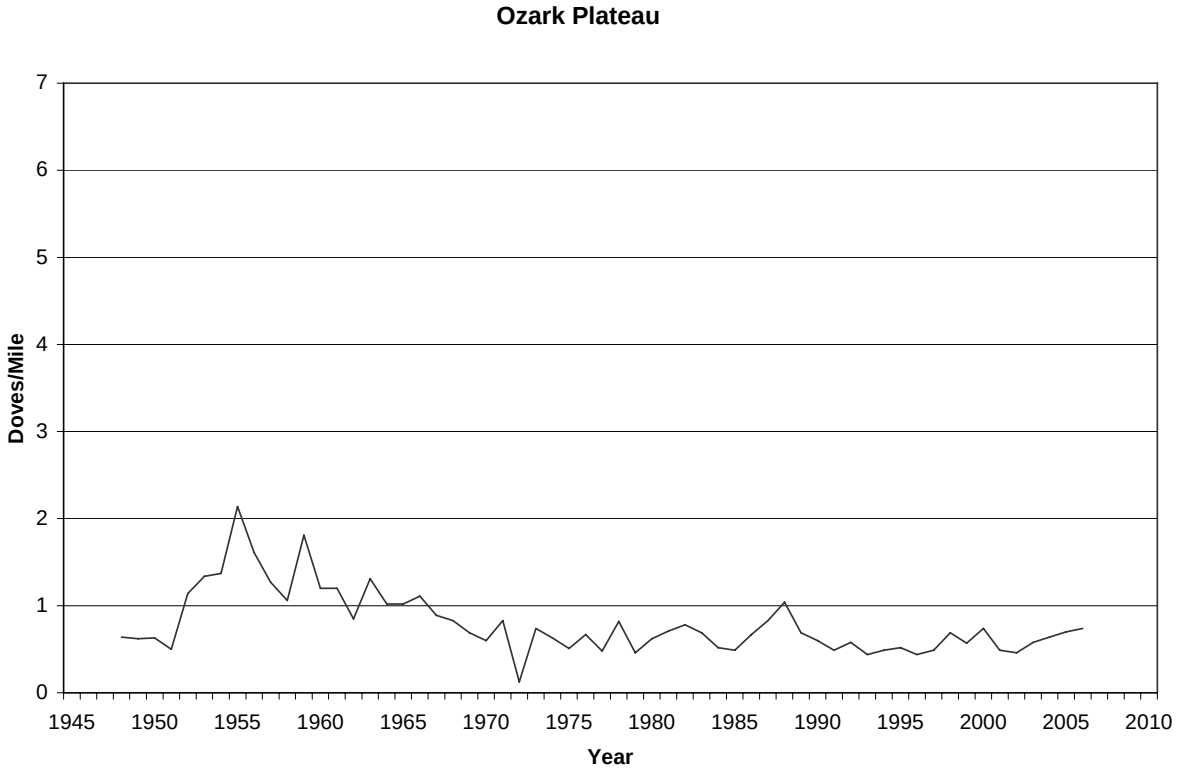

Figure 15. Ozark Plateau Zoogeographic Region.

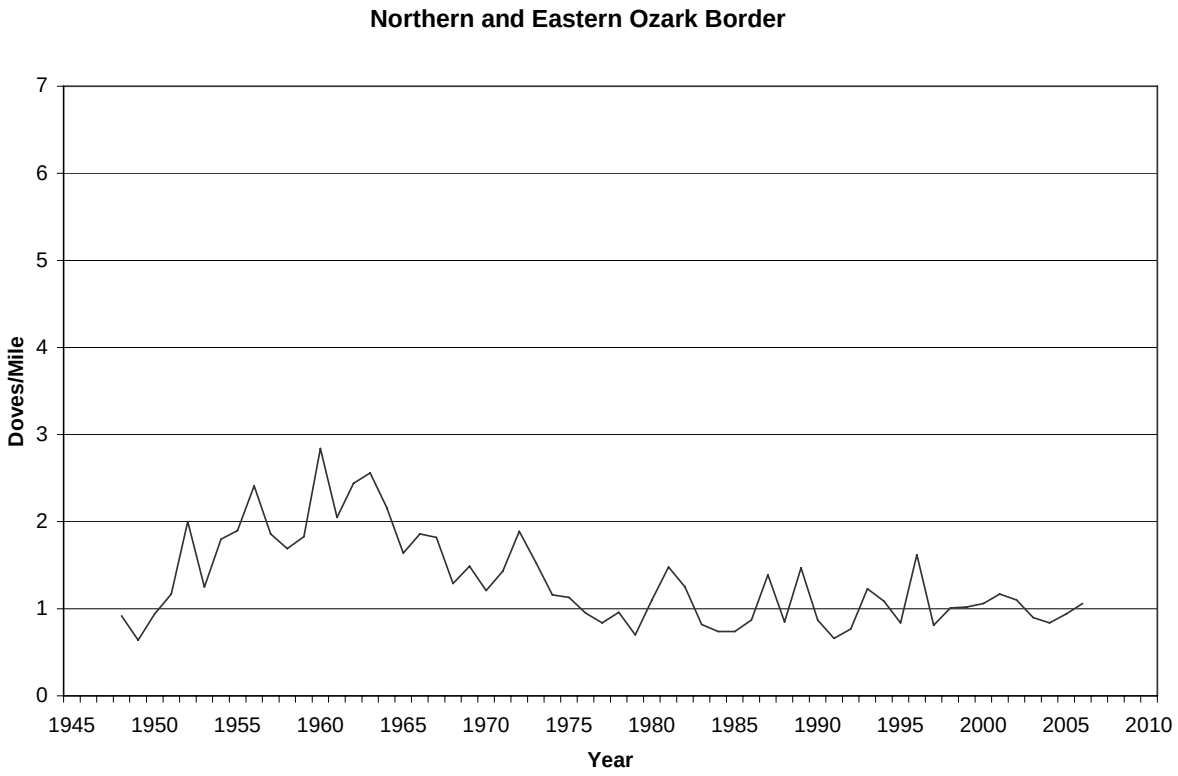

Figure 16. Northern and Eastern Ozark Border Zoogeographic Region.

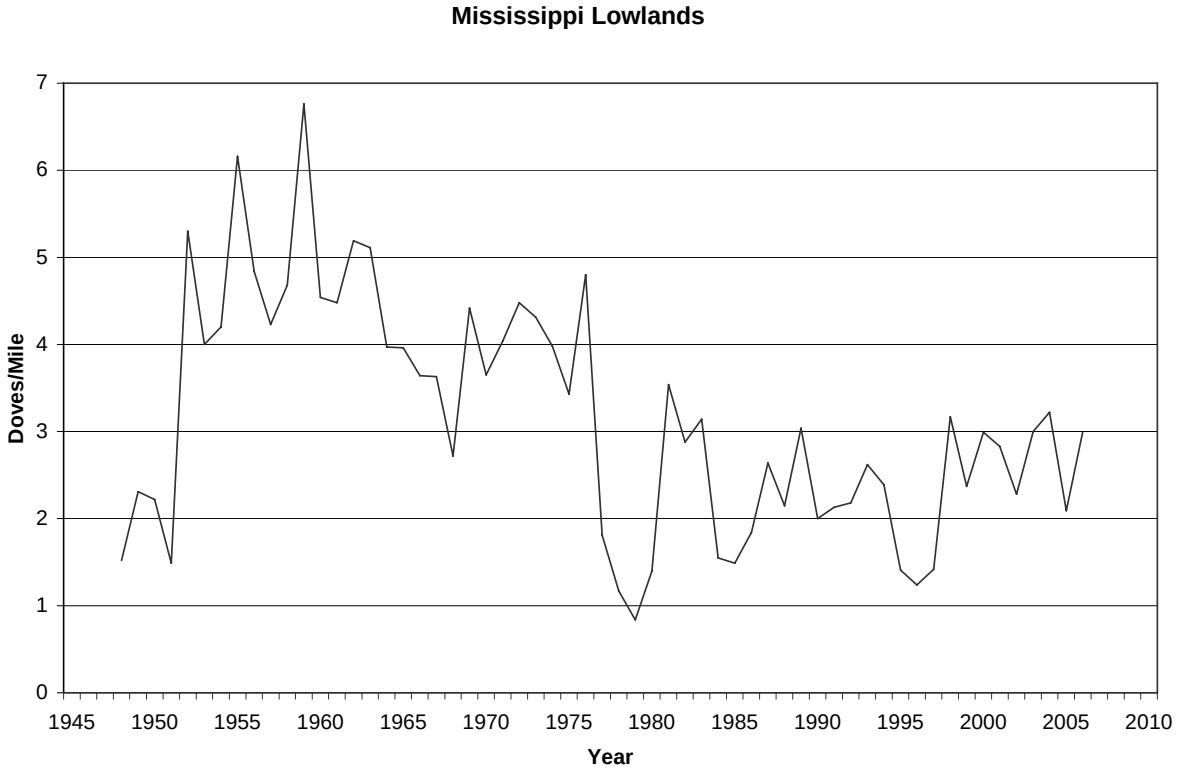

Figure 17. Mississippi Lowlands Zoogeographic Region.